

## Occurrence of Bovine Dermatophilosis in Ambo Town, West Shoa Administrative Zone, Ethiopia

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**Abstract:** A study was conducted on 384 animals in and around Ambo town, West Shoa Zone, Oromia regional state, Ethiopia from October, 2010 to March, 2011 with the aim of determining the prevalence, associated risk factors and to give recommendations how the disease could be managed. Clinical and Giemsa staining were the techniques used for the identification of *Dermatophilus congolensis*. Twenty (5.21%) of the animals were affected by the disease which was more prevalent in imported (66.67%) than local (3.21%) animals, in wet (10.35%) than dry season (0.95%), in males (4.29 %) than females (5.88 %), in  $\geq 3$  years old (5.52%) than in  $< 3$  years old (4.98%) and in animals with tick infestation (5.8%) than those without tick infestation (2.67%). There was a significant difference ( $p < 0.05$ ) between breeds, season and tick infestation. However, the difference in the prevalence of age groups and sex were not significant ( $p > 0.05$ ). *Amblyomma variegatum* was the predominant tick species identified during the study. This study also indicated that dermatophilosis is a potential determinant factor for the dairy development strategy started through imported cattle in the study area. Tick control especially on imported cattle is suggested to reduce the risk of dermatophilosis.

**Key words:** Ambo % Bovine % *Dermatophilus congolensis* % Prevalence % Ticks

### INTRODUCTION

Ethiopia is a leading country in the number of animals in African continent. The output in terms of contribution to the improvement of the livelihood of animals' owners and for the ground of the national economy is at a lower stage compared to the vast resources on hand. Skin disease imposed economic losses as a result of reduction of wool quality, meat and milk yield losses, culling and usually mortalities and losses associated with treatment and prevention of the disease [1].

Among the skin diseases, bovine dermatophilosis is one of the common economically important diseases of cattle [2]. Dermatophilosis is an exudative pustular dermatitis that affects mainly cattle, sheep and horses but also goats, dogs, cats and many wild mammals, reptiles and occasionally human [3]. It is a skin disease caused by a bacterium *dermatophilus congolensis* [4]. Bovine dermatophilosis is also known as cutaneous streptothricosis that can be acute or chronic exudative epidermitis with scab formation, first recorded in cattle in

Belgian Congo with the name dermatose contagieuse [2]. The infection is characterized by the formation of thick crusts which come away easily with tuft of hair leaving a moist, depressed area with bleeding points from capillaries [5]. *Dermatophilus congolensis* is a facultative anaerobic actinomycete and its chronic form is associated with tick infestation [6]. It produces characteristic narrow, tapering filaments with lateral branching at right angles [7].

In Ethiopia, though difficult to point out period of the introduction and detail background of the disease, nowadays it is found to be one of the diseases with high economic significance in decreasing the productivity of the animals [8]. Although the presence of the disease was confirmed by Tesfaye [7], Woldemeskel [9] and Enquebaber [10], the attention accorded is limited and the epidemiology has not been fully investigated [1, 11]. So far, the extent of the disease was not studied in Ambo and its surroundings. Therefore, the objectives of this work were to determine the prevalence of bovine dermatophilosis in and around Ambo town and to point out the common risk factors associated with the disease.

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## MATERIALS AND METHODS

This study was conducted from October, 2010 to March, 2011 in and around Ambo, Western Shoa Zone, Oromia Regional State and West of Ethiopia.

**Study Animals:** This cross sectional study was carried out on 384 animals of bovine species (12 cross and 372 local breeds) having mixed sex and age groups. During the study, animals were categorized in-to two groups based on their age as young if less than three years old and adult if they are above this age according to Samui and Jones [12], sex (Male and Female), breed (Local and Cross), tick infestation presence or absence and finally season of the year in which animals were examined (wet and dry season).

**Sampling Method and Sample Size Determination:** Simple random sampling method was used for sampling and 95% confidence interval was applied. The sample size was determined by the formula given by Thrusfield [13]. Based on this, the total sample size was calculated to be 384.

**Study Design:** Generally, observation was made randomly by taking any case and examined externally for the presence of any skin lesion. After inspection of external surface, palpation was done to feel bumps of exudates beneath the hair coat. Lesion characterized by loss of hair, scab formation, thickening of the skin, nodular formation and exudation were suspected to be infected with dermatophilosis and were recorded. By collecting skin scrapings in dry sterile test tubes which were examined under the microscope after staining using Giemsa stains for mutiplaner septate bodies. The age, sex, breed, tick infestation and season of the year of affected animals were recorded and their influence on the prevalence rate was assessed by using chi square ( $P^2$ ) test.

**Data Analysis:** Statistical analysis was done using SPSS 17.0 version soft wares. The significant level was determined at  $P < 0.05$  for all statistically analyzed tests.

## RESULTS

Twenty animals (12 locals and 8 imported) were found to be positive for bovine dermatophilosis with an overall prevalence of 5.21% (20/384). The prevalence of the disease in the local and cross breeds was also calculated as 3.23 (12/372) and 66.67 % (8/12), respectively.

Table 1: Factors affecting the prevalence of bovine dermatophilosis among examined animals

	Number of examined animals	Number of positive cases	Prevalence (%)
Breed			
Local			
Male	163	7	4.29
Female	209	5	2.39
Imported			
Male	-	-	-
Female	12	8	66.67
Age			
=3 years	163	9	5.52
>3 years	221	11	4.98
Season			
Dry	210	2	0.95
Wet	174	18	10.34

$P^2 = 94.77$ ,  $df = 1$ ,  $p < 0.05$  (Breed);  $P^2 = 0.06$ ,  $df = 1$ ,  $p > 0.05$  (Age groups);  $P^2 = 17.00$ ,  $df = 1$ ,  $p < 0.05$  (Season)

Table 2: Prevalence of bovine dermatophilosis and tick infestation

Species of ticks	Number of animals examined	Number of positive cases	Prevalence(%)
Amblyomma spp.	85	11	12.94
Boophilus spp.	166	7	4.22
Hyalomma spp.	58	-	-
Total	309	18	5.83

$P^2 = 15.72$ ,  $df = 2$ ,  $p < 0.05$

The study was also carried out by grouping animals according to their sex where 7 males with a prevalence of (4.29%, 7/163) and 13 females (5.88 %, 13/221) were found to be positive for bovine dermatophilosis (Table 1).

Out of 163 young animals examined, eight animals were found to be positive for bovine dermatophilosis with a prevalence of 5.52 % (9/163) and 4.98 % (11/221) for adults (Table 1).

174 animals during the wet season were examined and 18 positive cases were obtained with a prevalence of 10.34 (18/174) and 0.95% (2/210) during dry season (Table 1).

Out of 309 animals with tick infestation, 18 animals were found to be positive for the disease with a prevalence of 5.83 % (18/309) (Table 2) and 2.67 % (2/75) for animals without tick infestation

A questionnaire was made for 20 farmers to understand their attitude towards bovine dermatophilosis. Among them 5 farmers gave a response as they were familiar with the disease. They also stated that, they do have a tick control method which is effective after spraying topically on the skin of affected animals.

## DISCUSSION

In this study an overall prevalence of 5.21% was recorded. This is a lower prevalence than the report of Degu [4] which was 15.2% (in Adama), but it is higher than the report of Tesfaye [7], Meseret and Safinew [14] which were 5 and 1.04%, respectively. This may be attributed to the existence of favorable factors believed to be involved in the initiation and transmission of the disease in the area. Among the factors; ectoparasites, thorny bushes, ox-pecker birds, rain in wet season, irregular application of acaricides in dry season.

During the study, the prevalence of bovine dermatophilosis was significant ( $p < 0.05$ ) between the imported and local breeds in that imported breed animals were highly infected with *D. congolensis* than local breeds. The difference in the prevalence between these two breeds may be due to the lower immunity of imported animals compared to that of the local ones. This is similar to the report of Woldemeskel [9] and Meseret and Sefinew [14]. But this result is not conclusive as only a few imported animals (12) were examined during the study. Previous studies have indicated that the prevalence is lower in indigenous cattle than in exotic breeds and their crosses (4.8 vs 12.8%) [15]. Generally the prevalence of bovine dermatophilosis during the study was 3.2% (12/372) and 66.7% (8/12) for local and imported breeds, respectively.

Animals were also categorized based on their sex to assess the difference in the prevalence between males and females. From the result, the study indicated that there is no significant ( $p > 0.05$ ) variation between the mentioned sex groups. Even though, there was a higher prevalence in male animals which may be due to the skin damage as a result of work overload in male animals like traction and threshing in the mixed crop-livestock production.

The absence of a significant ( $p > 0.05$ ) difference in the prevalence rate between males and females agrees with the previous report of Woldemeskel [9]. The prevalence of the disease for both age groups was calculated as 4.29 (7/163) and 2.39% (5/209) for local males and females and 66.67% for imported females, respectively.

The prevalence of the disease was lower in young animals ( $< 3$  years old) when compared to that of adults ( $\geq 3$  years old) which may probably due to the reason that they were mostly kept in doors with less chance of exposure to the various predisposing factors such as thorny plants, ox-pecker birds and rain fall than the older cattle. This is in agreement with the record of

Woldemeskel and Taye [15], bovine dermatophilosis is more prevalent in adult ( $\geq 3$  years old) (5.52%) animals than that of young's ( $< 3$  years old) (4.98%).

In the current study, there was a significant ( $p < 0.05$ ) variation between season of the year and bovine dermatophilosis which is highly prevalent during wet season than the dry season. The prevalence of the disease was 0.95 (2/210) and 10.35 % (18/174) during the dry and wet season, respectively. The higher prevalence of the disease during the mentioned season is due to activation of the motile zoospores by rain and increased insect population (ticks) so that they may contribute for the occurrence of the disease. Degu [4] explained that intense or prolonged wetting of the skin apparently results in emulsification and disruption of sebaceous film as well as of the stratum corneum, which then become more permeable to irritant substances and probably more susceptible to disturbances by mechanical objects. In addition to this, water help to discharge of the zoospores from the scabs and to carry them from one part of the body to another.

The study indicated that there is a significant ( $p < 0.05$ ) prevalence in cattle infested with ticks than those which are not infested with ticks. This may be due to the fact that toxins present in saliva of ticks result in immunosuppression of the animals. It has been noticed that tick and season of the year were the commonest risk factors associated with bovine dermatophilosis. Among the tick species identified to assess their effect for the occurrence of BD, *A. variegatum* and *B. annulatus*, were the common ones. From 309 tick infested animals 18 (5.8%) were also affected with dermatophilosis which is lower than the report of Woldemeskel and Taye [15]. From this finding, *A. variegatum* 12.94 % (12/85) is the most prevalent tick species.

Although, infestation with ticks was the main risk factor in the area, appropriate control measures were practiced most commonly by the farmers during the rainy season due to increased population of insects. Once after the acaricides were applied, a good treatment response was observed. It was understood that modern treatment like streptomycin, is the most effective treatment for bovine dermatophilosis from the questionnaire. Five percent of the farmers explained that, the disease has a significant role on their market economy. From these economic losses; body weight loss of the animals, decreased milk yield and acceptance of live animals in the market would also be reduced relative to dermatophilosis free animals.

In this current study, the prevalence of bovine dermatophilosis was determined after different predisposing factors were taken into consideration. Among the risk factors; breed of the animals, sex, age, season of the year and tick infestation were the common factors associated with the disease. Different tick species were identified as important risk factor for the occurrence of bovine dermatophilosis of which *Amblyomma variegatum* was the predominant species.

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